# Bullying Changes Genes in Children's DNA, Scientists Say

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COLUMN by LEE DYE via World News

A new study suggests that children who bully are twice as likely to have a mental health disorder.

New research shows that the chemical structure surrounding part of the **genetic blueprint** of a young child is physically changed by **bullying**, leaving the victim less able to respond properly to the stress and possibly paving the way for mental problems later in life. The findings challenge the popular assumption that DNA is largely immutable, remaining basically unchanged throughout a person's life. But what does change, according to the research, is how one critical gene known to be involved in regulating mood is crippled, leaving the victim unable to deal with the stress.

"Bullying is a serious matter, not only on the short term consequences, but it also leaves kind of a physiological change that could affect (the victim's) mental health later on," Isabelle Ouellet-Morin of the University of Montreal, lead author of a study in the current issue of the journal Psychological Medicine, said in a telephone interview.

Overreacting to stress can be harmful, of course, but failing to react in a reasonable manner isn't healthy either, she added. Her previous research shows that "children who were bullied or maltreated showed less reactivity to stress and had more problems in social interaction and had more externalized problems, such as aggression." It's normal to be angry when bullied, and failure to deal with that stress may be just as harmful as overreacting.

Ouellet-Morin and her colleagues found that the level of cortisol, the so-called stress hormone, was suppressed in children who had been bullied. That reduction, she said, resulted in a change in the structure surrounding a gene that regulates serotonin, a neurotransmitter involved in mood regulation and depression. The work is part of a growing body of research on epigenetics, a relatively new field that has challenged many beliefs on genetics. That work shows that while genes themselves may remain largely unchanged, the way they are expressed -- or what genes do for a living -- can be profoundly influenced by the environments in which we live.

**Nature vs. Nurture**

It's sort of a revival of the old nature-vs.-nurture debate. In this age of genetic advancement, nature has held the upper hand, but epigenetics adds a new twist -- nurture, or our social interactions, may be an extremely important player in determining how our genes are expressed. While the finding that bullying can influence DNA may be frightening, the research also suggests the possibility of reversing the damage. It isn't known yet whether the physiological changes from bullying are permanent. It may be, she suggested, that dealing with bullying and nurturing the victims may reverse the damage. But at this point, no one knows for sure.

Ouellet-Morin's research is part of the Environmental Risk Longitudinal Twin Study in England, where she worked before returning to Montreal. The researchers concentrated on 28 sets of identical twins from 2,232 British children in the overall study. In all 28 cases, one twin had been bullied, but the other twin had not, according to the children, their mothers, and others. DNA samples were collected at ages 5 and 10, and cortisol was measured at 5, 10 and 12.

## Children's DNA Expression Changed by Bullying

The researchers found "blunted cortisol responses to stress in bullied twins in comparison with their non-bullied co-twins." Thus, the victims were inhibited in having a normal reaction to the stress of being bullied. That difference could not be attributed to genetic differences, because they were identical twins. Nor could it be blamed on different family environments, because both twins were raised in the same conditions. The difference, the researchers concluded, came from changes in gene expression through epigenetics that left the victims less responsive to stress.

"The victims were not reacting physiologically to stress," Ouellet-Morin said in the interview. "The non-bullied twins showed the normal response, which is secreting the stress hormone while under stress." That failure to deal normally with the stress could have left them less resilient, and more prone to mental and social problems, she suggested. The researchers conclude that the difference resulted entirely from bullying.

"This hypothesis is consistent with accumulating evidence, mainly derived from animal studies, showing that epigenetic remodeling represents a mechanism by which adverse experiences disrupt reactivity to stress and health," the study adds.

The bottom line here is that bullying must be taken very seriously, she said, but there is reason to hope that the effect doesn't have to be permanent.

"If we accept the idea suggested by this study," she said, "that social environment can change DNA manipulation that is important for stress reactivity and mood regulation, then if we change that environment, if we make sure the victims are not victimized anymore, or if we give them the proper resources to cope better with the situation and get on with their lives, then we have the possibility of reversing what we are observing right now."

Maybe there is light at the end of this very dark tunnel.

Name: _____ Period: _____ Date: _____

Response to “Bullying Changes Genes in Children’s DNA, Scientists Say”

1.) Which words were you unfamiliar with in this article? What do you think they mean using the context clues in the reading?

| Unfamiliar Word: | What I think this means based on text evidence: |
| --- | --- |
| | |

2.) How does bullying affect genes, according to the author?

3.) What does the saying, “Nature vs. Nurture” mean?

4.) Is the damage caused by bullying permanent? Why or why not? (Use text details.)

**On the back, write a paragraph stating whether you support the claims in this article or not. You must include at least 3 specific reasons and text evidence to support or refute. Minimum of 5 sentences.**